

AMENDMENTS TO THE CLAIMS

Please add or amend the claims to read as follows:

CLAIMS

I claim:

1. (currently amended) ~~[[A system]]~~ An autonomous device configured for being capable of passing through a body lumen, the device for determining in vivo conditions, ~~the system~~ comprising:

at least one interaction chamber for containing a sample, while ~~[[an]]~~ in vivo ~~[[sample]]~~, said interaction chamber having at least one indicator therein for reacting with the ~~[[in vivo]]~~ sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the interaction chamber; and

at least one optical detector for detecting optical changes occurring in the interaction chamber. *being connected with the chamber*

2. (currently amended) ~~A system~~ The autonomous device according to claim 1 wherein at least a portion of the interaction chamber is transparent in the wavelength of illumination.
3. (currently amended) ~~A system~~ The autonomous device according to claim 1 comprising a plurality of interaction chambers.
4. (currently amended) ~~A system~~ The autonomous device according to claim 1 further comprising a micro pump for drawing the ~~in vivo~~ sample.

5. (currently amended) ~~A system~~ The autonomous device according to claim 3 wherein one interaction chamber comprises one indicator and another interaction chamber comprises another indicator.
6. (currently amended) The autonomous device ~~A system~~ according to claim 1 wherein the interaction chamber is sealed by at least one membrane which selectively enables passage of ~~an in-vivo~~ a sample but does not enable passage of the indicator.
7. (currently amended) The autonomous device ~~A system~~ according to claim 1 wherein the indicator is immobilized onto the interaction chamber walls.
8. (currently amended) The autonomous device ~~A system~~ according to claim 1 wherein the indicator is immobilized onto an appendage that is restricted to the interaction chamber.
9. (currently amended) The autonomous device ~~A system~~ according to claim 1 wherein the optical detector is an imager for obtaining images of the interaction chamber.
10. (currently amended) The autonomous device ~~A system~~ according to claim 9 further comprising a transmitter for transmitting the images.
11. (currently amended) The autonomous device ~~The system~~ according to claim 10 further comprising a receiving system for receiving the images.
12. (currently amended) The autonomous device ~~A system~~ according to claim 1 wherein the optical detector is an imager for obtaining images of a body lumen and of the interaction chamber.
13. (currently amended) The autonomous device ~~A system~~ according to claim 1 wherein the optical detector is an imager for obtaining images of a body lumen and of the interaction chamber and for producing video signals thereof.

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14. (currently amended) The autonomous device ~~A system~~ according to claim 13 further comprising a transmitter for transmitting the video signals and a receiving system for receiving said video signals.
15. (currently amended) The autonomous device ~~A system~~ according to claim 1 wherein the autonomous device system is contained within or affixed onto a device that is designed for being inserted into a body lumen.
16. (currently amended) The autonomous device ~~A system~~ according to claim 9 wherein the autonomous device system is contained within or affixed onto a device designed for being inserted into a body lumen.
17. (currently amended) The autonomous device ~~A system~~ according to claim 12 wherein the autonomous device system is contained within or affixed onto a device designed for being inserted into a body lumen.
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18. (currently amended) The autonomous device ~~A system~~ according to claim 12 further comprising an optical system.
19. (currently amended) A system for determining in vivo conditions, the system having at least two opposing ends and comprising:

two interaction chambers for containing ~~an in-vivo~~ a sample while in vivo, said interaction chambers each having at least one indicator therein for reacting with the [[in vivo]] sample for generating optical changes in ~~the said two~~ interaction chambers;

at least one illumination source for illuminating ~~the said two~~ interaction chambers;
and

two image sensors for detecting optical changes occurring in ~~the~~ said two interaction ~~[[chamber]]~~ chambers and for obtaining in vivo images,

wherein ~~the~~ said two interaction chambers and the imagers are each positioned at an opposing end of the system.

20. (currently amended) The system according to claim ~~[[1]]~~ 19 further comprising a battery for providing power to elements of the system.
21. (currently amended) An autonomous device configured for being capable of passing through a body lumen, the device ~~A system~~ for determining in vivo ~~[[situ]]~~ body lumen conditions and ~~[[comprising]]~~ comprising:

at least one interaction chamber for containing an endo-luminal sample in-vivo, said interaction chamber comprising at least one indicator for reacting with the endo - luminal sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the body lumen and the interaction chamber;

at least one imager for imaging the body lumen and for imaging the interaction chamber.

22. (currently amended) An autonomous device configured for being capable of passing through a body lumen, the device ~~A device~~ for determining in vivo GI tract conditions, comprising:

at least one interaction chamber for containing a sample from the GI tract environment, said interaction chamber comprising at least one indicator for reacting with the sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the interaction chamber;

at least one optical detector for detecting in vivo optical changes occurring in the interaction chamber.

23. (currently amended) An autonomous device configured for being capable of passing through a body lumen, the device ~~A device~~ for imaging the GI tract and for determining in vivo GI tract conditions, ~~[[comprising]]~~ comprising:

at least one interaction chamber for containing a sample from the GI tract environment, said interaction chamber comprising at least one indicator for reacting with the sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the GI tract and the interaction chamber;

at least one imager for imaging the GI tract and for imaging the interaction chamber and for producing video signals thereof.

24. (original) A device according to claim 23 further comprising a transmitter for transmitting the video signals.

25. (currently amended) An autonomous device configured for being capable of passing through a body lumen, said ~~[[A]]~~ device for in vivo determining ~~in situ~~ of GI tract conditions, the device ~~[[comprising]]~~ comprising:

at least one interaction chamber for containing a sample from the GI tract environment, said interaction chamber comprising at least one indicator for reacting with the sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the GI tract and the interaction chamber;

at least one imager for imaging the GI tract and for imaging the interaction chamber.

26. (original) A device according to claim 25 wherein the device is a swallowable capsule.
27. (currently amended) A method for determining in vivo body lumen conditions, the method comprising the steps of:

receiving an endo – luminal sample in an interaction chamber that is configured in an autonomous device capable of passing through a body lumen, said interaction chamber having at least one indicator therein for reacting with the endo – luminal sample for generating optical changes in the interaction chamber;

illuminating the interaction chamber; and

detecting optical changes occurring in the interaction chamber .

28. (original) A method according to claim 27 wherein at least a portion of the interaction chamber is transparent in the wavelength of illumination.
29. (original) A method according to claim 27 wherein the optical detector is an imager and the step of detecting the optical changes is a step of imaging the interaction chamber.
30. (original) A method according to claim 29 further comprising the step of producing video signals of images of the interaction chamber.
31. (original) A method according to claim 30 further comprising the steps of transmitting the video signals to a receiving system and of receiving the video signals.
32. (currently amended) A method for determining in vivo GI tract conditions, the method comprising the steps of:

receiving a sample from the GI tract in an interaction chamber that is configured in an autonomous device capable of passing through a body lumen, said interaction chamber having at least one indicator therein for reacting with the sample for generating optical changes in the interaction chamber;

illuminating the interaction chamber; and

detecting in vivo optical changes occurring in the interaction chamber.

33. (original) A method according to claim 32 wherein the optical detector is an imager and the step of detecting the optical changes is a step of imaging the interaction chamber and of producing video signals thereof.
34. (original) A method according to claim 33 further comprising the steps of transmitting the video signals to a receiving system and of receiving the video signals.
35. (currently amended) A method for imaging the GI tract and determining in vivo GI tract conditions, the method comprising [[the steps of]]:

receiving a sample from the GI tract in an interaction chamber that is configured in an autonomous device capable of passing through a body lumen, said interaction chamber having at least one indicator therein for reacting with the sample for generating optical changes in the interaction chamber;

illuminating the interaction chamber; and

imaging the GI tract and interaction chamber and producing video signals thereof.

36. (original) A method according to claim 35 further comprising the steps of transmitting the video signals to a receiving system and of receiving the video signals.

37. (currently amended) A method for determining in vivo ~~[[situ]]~~ GI tract conditions comprising the steps of:

receiving a sample from the GI tract in an interaction chamber that is configured in an autonomous device capable of passing through a body lumen, said interaction chamber having at least one indicator therein for reacting with the sample for generating optical changes in the interaction chamber;

illuminating the interaction chamber; and

imaging the GI tract and interaction ~~[[chamber .]]~~ chamber.

38. (currently amended) A capsule for imaging the GI tract and for determining in vivo GI tract conditions, ~~comprising comprising:~~

a system, said system ~~comprising comprising:~~

at least one interaction chamber for containing a sample from the GI tract environment, said interaction chamber comprising at least one indicator for reacting with the sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the GI tract and the interaction chamber;

at least one imager for imaging the GI tract and for imaging the interaction chamber and for producing video signals thereof; and

a transmitter for transmitting the video signals to a receiving system.

39. (original)The capsule according to claim 38 wherein the capsule comprises two opposing ends and wherein the capsule comprises two interaction chambers and two imagers and wherein the interaction chambers and the imagers are each positioned at an opposing end of the capsule.

40. (currently amended) A device comprising a transmitter for transmitting video signals, said transmitter operable with a system, said ~~system comprising device~~ comprising:

at least one interaction chamber that is configured in an autonomous device capable of passing through a body lumen for containing a sample from the GI tract environment, said interaction chamber comprising at least one indicator for reacting with the sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the body lumen and the interaction chamber;

at least one imager for imaging the body lumen and for imaging the interaction chamber and for producing video signals thereof, said video signals being transmitted by the transmitter.

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41. (currently amended) A device comprising a transmitter according to claim 40 wherein the transmitter transmits the video signals to a receiving system external to the body lumen.

42. (currently amended) A ~~receiving system~~ comprising a receiver for receiving video signals, ~~operable with a system~~, said system ~~[[comprising]]~~ comprising:

at least one interaction chamber that is configured in an autonomous device capable of passing through a body lumen for containing a sample from the GI tract environment, said interaction chamber comprising at least one indicator for reacting with the sample for generating optical changes in the interaction chamber;

at least one illumination source for illuminating the body lumen and the interaction chamber;

at least one imager for imaging the body lumen and for imaging the interaction chamber and for producing video signals thereof; and

at least one transmitter for transmitting the video signals, said video signals being received by the receiving system.

43. (new) A capsule comprising:

at least one interaction chamber for containing a sample while in vivo, said interaction chamber including at least one indicator disposed therein to react with the sample and to generate optical changes in the interaction chamber;

at least one illumination source; and

at least one optical detector.

Al 44. (new) The capsule of claim 43, wherein the illumination source is to illuminate the interaction chamber.

45. (new) The capsule of claim 43, wherein the optical detector is to detect optical changes occurring in the interaction chamber.

46. (new) The capsule of claim 43, comprising a transmitter.

47. (new) The capsule of claim 43, comprising a micro-pump.